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PTO/SB/05 (12/97)
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Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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UTILITY PATENT APPLICATION TRANSMITTAL

Attorney Docket No. 000921 Total Pages 2
First Named Inventor or Application Identifier
Ren Judkins
Express Mail Label No. EL703304098US

APPLICATION ELEMENTS
See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. ☒ Fee Transmittal Form
(Submit an original, and a duplicate for fee processing)
2. ☒ Specification [Total Pages 14]
(preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the invention
 - Brief Summary of the invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 USC 113) [Total Sheets 3]
4. Oath or Declaration [Total Pages 2]
 - a. ☐ Newly executed (original or copy)
 - b. ☒ Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 17 completed)
[Note Box 5 below]
 - c. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting
inventor(s) named in the prior application,
see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☒ Incorporation By Reference (useable if Box 4b is checked)
The entire disclosure of the prior application, from which a
copy of the oath or declaration is supplied under Box 4b,
is considered as being part of the disclosure of the
accompanying application and is hereby incorporated by
reference therein.

6. ☐ Microfiche Computer Program (Appendix)
7. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement [] Power of Attorney
(when there is an assignee)
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure [] Copies of IDS
Statement (IDS)/PTO-1449 Citations
12. ☒ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
14. ☐ Small Entity [] Statement filed in prior application,
Statement(s) Status still proper and desired
15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Other:

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information: 08/75,282 and
☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: 08,412,875, now

18. CORRESPONDENCE ADDRESS U.S. Patent 5,630,898

☐ Customer Number or Bar Code Label

23464
(insert Customer No. or Attach bar code label here)

or ☒ Correspondence address below

NAME	Lynn J. Alstadt				
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FEE TRANSMITTAL for FY 2001

Patent fees are subject to annual revision

TOTAL AMOUNT OF PAYMENT (\$ 710.00

Complete if Known

Application Number
Filing Date
First Named Inventor Ren Judkins
Examiner Name
Group Art Unit
Attorney Docket No. 000921

METHOD OF PAYMENT

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to.

Deposit Account Number 02-4553
Deposit Account Name Buchanan Ingersoll

- ☐ Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17
☐ Applicant claims small entity status. See 37 CFR 1.27

2. ☒ Payment Enclosed:

☒ Check ☐ Credit card ☐ Money Order ☐ Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
101 710	201 355	Utility filing fee	710
106 320	206 160	Design filing fee	
107 490	207 245	Plant filing fee	
108 710	208 355	Reissue filing fee	
114 150	214 75	Provisional filing fee	

SUBTOTAL (1) (\$ 710.00

2. EXTRA CLAIM FEES

Total Claims 7
Independent Claims 1
Multiple Dependent
Extra Claims -20** = 0
-3** = 0
Fee from below
Fee Paid

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
103 18	203 9	Claims in excess of 20
102 80	202 40	Independent claims in excess of 3
104 270	204 135	Multiple dependent claim, if not paid
109 80	209 40	** Reissue independent claims over original patent
110 18	210 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$)

*or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
105 130	205 65	Surcharge - late filing fee or oath	
127 50	227 25	Surcharge - late provisional filing fee or cover sheet	
139 130	139 130	Non-English specification	
147 2,520	147 2,520	For filing a request for ex parte reexamination	
112 920*	112 920*	Requesting publication of SIR prior to Examiner action	
113 1,840*	113 1,840*	Requesting publication of SIR after Examiner action	
115 110	215 55	Extension for reply within first month	
116 390	216 195	Extension for reply within second month	
117 890	217 445	Extension for reply within third month	
118 1,390	218 695	Extension for reply within fourth month	
128 1,890	228 945	Extension for reply within fifth month	
119 310	219 155	Notice of Appeal	
120 310	220 155	Filing a brief in support of an appeal	
121 270	221 135	Request for oral hearing	
138 1,510	138 1,510	Petition to institute a public use proceeding	
140 110	240 55	Petition to revive - unavoidable	
141 1,240	241 620	Petition to revive - unintentional	
142 1,240	242 620	Utility issue fee (or reissue)	
143 440	243 220	Design issue fee	
144 600	244 300	Plant issue fee	
122 130	122 130	Petitions to the Commissioner	
123 50	123 50	Petitions related to provisional applications	
126 240	126 240	Submission of Information Disclosure Stmt	
581 40	581 40	Recording each patent assignment per property (times number of properties)	
146 710	246 355	Filing a submission after final rejection (37 CFR § 1.129(a))	
149 710	249 355	For each additional invention to be examined (37 CFR § 1.129(b))	
179 710	279 355	Request for Continued Examination (RCE)	
169 900	169 900	Request for expedited examination of a design application	

Other fee (specify)

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$)

SUBMITTED BY

Name (Print/Type) Lynn J Alstadt
Signature
Registration No. (Attorney/Agent) 29,362
Telephone 412-562-1632
Date Oct. 31, 2000

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :
REN JUDKINS : PLEATED AND CELLULAR
Filed October 31, 2000 : MATERIALS AND METHOD FOR
THE MANUFACTURE THEREOF
USING A SPLITTER

PRELIMINARY AMENDMENT

Pittsburgh, Pennsylvania 15219

October 31, 2000

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

Please amend this application as follows:

In the Specification:

At page 1, lines 2 and 3, delete the title and insert:

-- TABBED MULTI-CELLULAR SHADE MATERIAL --.

Cross Reference to Related Applications

-- This application is a continuation of United States Patent Application Serial No. 08/756,282, filed November 25, 1996, which is a continuation of application Serial No. 08/412,875, filed March 29, 1995, now United States Patent No. 5,630,898. --

In the Claims:

Cancel claims 1 through 10.

Add the following new claims:

11. A multi-cellular pleated shade member having a front surface and a back surface opposed to one another comprising:

a series of front cells each cell having an outer wall and an inner wall, the outer wall having a crease and the front cells being connected to one another in a manner so that the creases of all front cells are parallel and the outer walls of the front cells form at least a portion of the front surface;

a series of back cells connected to the front cells, each back cell having an outer wall and an inner wall and a tab extending from the outer wall away from the inner wall; the back cells being connected to one another in a manner so that the tabs are parallel and the outer walls of the rear cells form at least a portion of the back surface.

12. The multi-cellular pleated shade member of claim 11 wherein the inner wall of at least one front cell is also the inner wall of at least one back cell.

13. The multi-cellular pleated shade member of claim 11 wherein the front cells and the rear cells form a double cell honeycomb material.

14. The multi-cellular pleated shade member of claim 11 wherein each back cell is comprised of two strips of shade material bonded together to form the tab and the outer wall.

15. The multi-cellular pleated shade member of claim 14 also comprising an adhesive bonding the two strips of shade material together.

16. The multi-cellular pleated shade member of claim 11 wherein each tab is formed by separate pieces of fabric bonded together by one of an adhesive, a hot melt adhesive and an ultrasonic bond.

17. The multi-cellular pleated shade member of claim 11 wherein each tab has a width of at least 1/16 inch.

In the Drawings:

Substitute the attached drawings for those filed with the original application.

Respectfully submitted,



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Registration No. 29,362

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Pittsburgh, Pennsylvania 15219

Attorney for Applicant

(412) 562-1632

FIG. 1

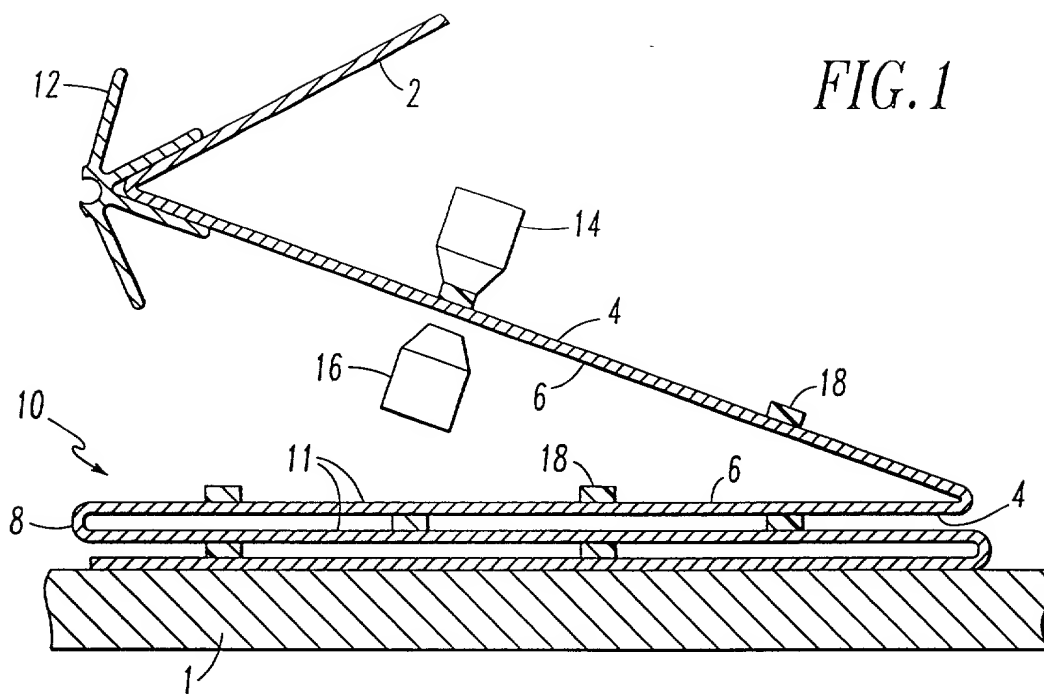
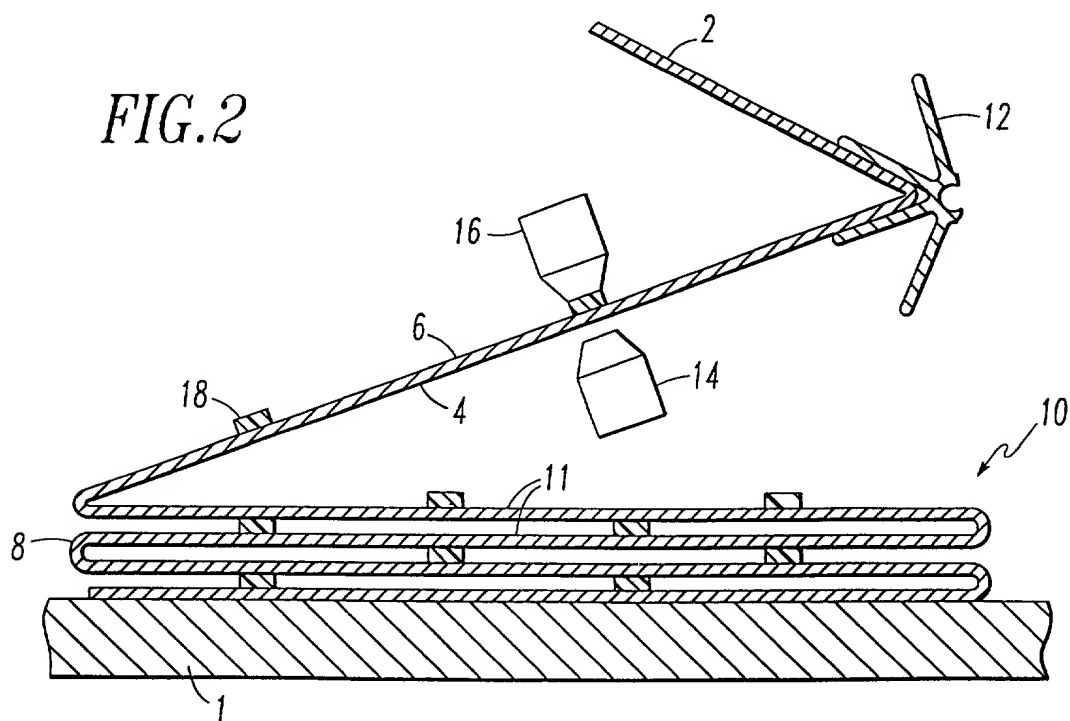


FIG.2



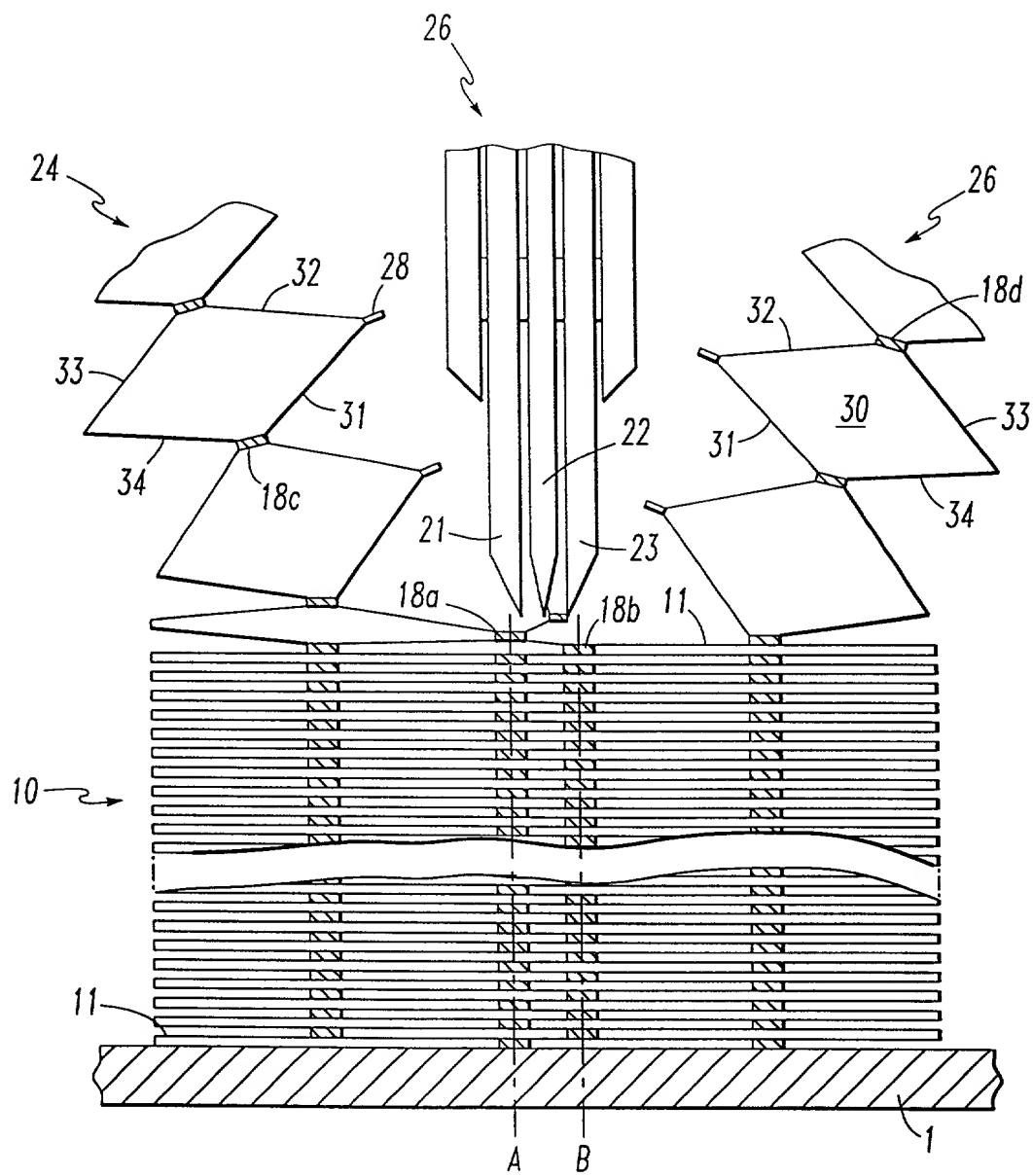


FIG. 3

FIG. 4

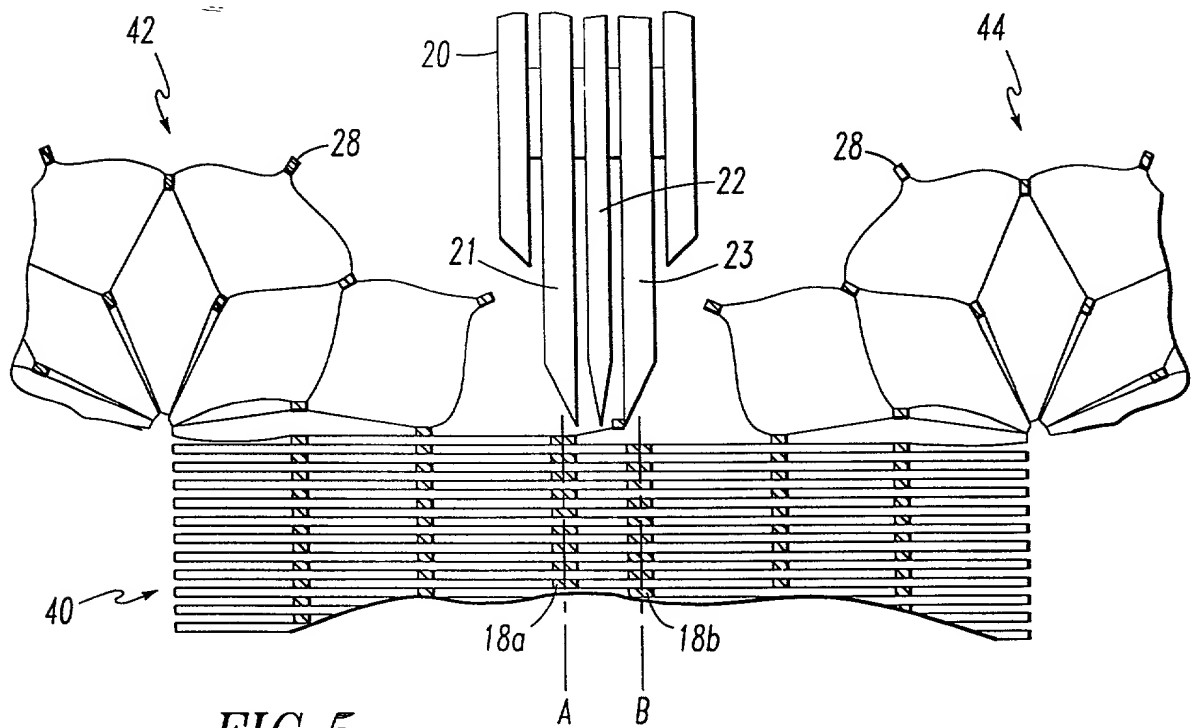
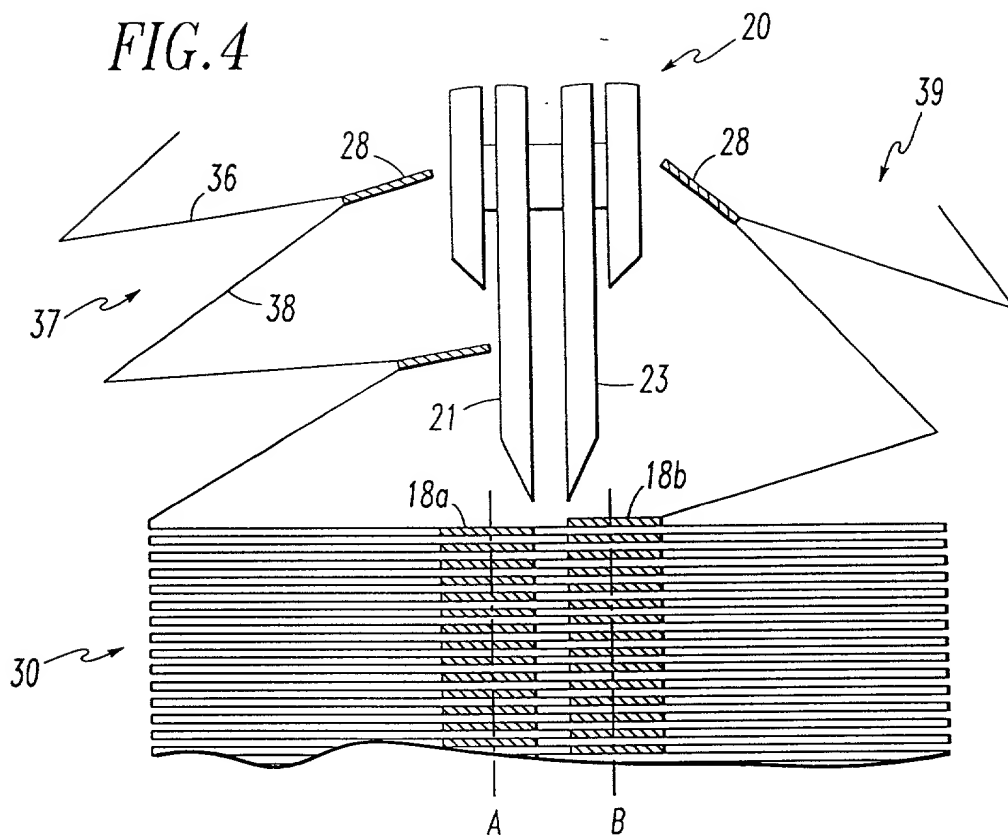


FIG. 5

TITLE

PLEATED AND CELLULAR MATERIALS AND METHOD FOR THE MANUFACTURE THEREOF USING A SPLITTER

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a pleated panel construction and method for the manufacture thereof and more particularly to a pleated shade construction, which results in an improved method for manufacturing variations of the well-known cellular shade constructions and other pleated shade constructions.

Description of the Prior Art

There are two basic types of folded window coverings. A first pleated type consists of a single layer of corrugated material. The other is a more complex cellular type where pleated layers are joined or folded strips are stacked to form a series of collapsible cells. This latter type is known to have favorable thermal insulation properties because of the static air mass which is trapped between the layers of material when the cells are in the expanded position. The single-layer type, on the other hand, is favored for its appearance in some cases, and is less expensive to manufacture. There is also a tabbed single layer of corrugated material which is disclosed in my United States Patent No. 4,974,656.

There are two basic approaches to making cellular products and tabbed panels from a roll of fabric material. The first method pleats or bonds the material transverse to the length of the roll and the second method pleats or bonds longitudinally along its length.

The output of the transverse method cannot be wider than the roll width of the original material. The longitudinal method is limited in the types of patterns that can be printed on the material because alignment is random. The transverse methods have been limited to a single layer, a single tabbed layer or a triple layer where there are three continuous surfaces that create a panel of double cells.

There is a need to have a transverse process that can make a panel of single cells. There is also a need to increase the speed of production output of single, double and triple layers.

There are several methods of producing the cellular shades. Most similar to the pleated, single-panel method is Anderson U.S. Patent No. 4,685,986. This method joins together two single-panel pleated lengths of material by adhesively bonding them together at opposing pleats. Other methods depart from this Anderson patent by joining together a series of longitudinally folded strips, rather than continuous sheets of pleated material. Such methods are shown in Colson U.S. Patent No. 4,450,027, and in Anderson U.S. Patent No. 4,676,855. In the Colson patent, strips of fabric are longitudinally folded into a

U-shape and adhered on top of one another, whereas in the Anderson patent these strips are Z-shaped and are adhered in an interlocking position.

In United States Patent No. 5,043,038 Colson discloses a method of cutting a honeycomb structure longitudinally to divide them into two tabbed single layer pleated panels. That honeycomb structure was formed from U-shaped strips as taught in Colson's United States Patent No. 4,450,027 by a process of winding the foldable material around a base apparatus, applying glue to one face of the material and adhering each layer to the adjacent layer. This method tends to cause the tab to wrinkle because the stack is wrapped on a slightly curved mandrel. Also, because the material layers are wound in a stack, the length of the panels of final product are limited to the height of the wrapped stack and the ends of the stack are wasted.

Another method for making cellular shades is disclosed in United States Patents 5,015,317; 5,106,444 and 5,193,601 to Corey et al. In that process fabric material is run through a production line that first screen prints the fabric and then applies thermoplastic glue lines at selected intervals. The fabric is then pleated, stacked, and placed in an oven to both set the pleats and bond the material at the glue lines.

There is a need for a method to utilize the current transverse processing equipment technology to make a larger variety of single and multi-layer panels at a faster rate.

SUMMARY OF THE INVENTION

The present method overcomes the problems and achieves the objectives indicated above by providing a method of manufacturing a pleated shade or a honeycomb structure by a means of splitting honeycomb or multicellular material into two or more tabbed, pleated panels or tabbed, cellular panels.

According to the teachings of the present invention, a stack of folded fabric is bonded to form a honeycomb structure having a series of cells connected together along bond lines. An interface region is present between adjacent cells which forms the bridge between horizontally adjacent stacks of cells. At least one bond line applied between adjacent fabric walls defines each interface region. These interface regions are split to form separate tabbed, pleated panels or separate panels of cells having tabs on one face between each pair of pleats. These tabs extending between each pleated panel or between individual cells, as the case may be, extend at least 1/16" in length. To simplify handling and to create a uniform appearance the tabs are identical in size resulting from a straight-line split along a distinct perpendicular plane, but the invention is not limited to this.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures 1 and 2 are diagrams showing how the honeycomb stack is formed.

Figure 3 is a diagram showing a triple cell honeycomb stack being split into two tabbed honeycomb panels according to the teachings of the present invention.

Figure 4 is a diagram showing a double cell honeycomb stack being split into tabbed panels.

Figure 5 is a diagram of a five cell honeycomb stack being split into two double honeycomb panels having tabs which are formed on one face of both panels.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figures 1 and 2, I provide a sheet of pleated fabric 2 which is folded on work surface 1 to form a fabric stack 10. Pleated fabric 2 is delivered to the work surface by a sprocket or other feed mechanism 12 which draws the fabric from a source of supply which is not shown. Glue applicators 14 and 16 apply bond lines 18 of hot melt glue on a surface 4 of the fabric. When the fabric is in the position shown in Figure 1 surface 4 is facing upward. After the fabric has been laid from right to left across the length of stack 10, the fabric is folded as shown in Figure 2. The movement of the stack relative to the fabric being supplied folds the fabric 2 back over the stack forming a pleat 8. Now surface 4 is facing down and opposite surface 6 is facing up. In that position glue applicator 16 applies lines of glue on surface 6. The fabric is laid across the stack from left to right. The process is repeated until a complete stack of fabric 10 has been created.

That stack will then have sets of bond lines in vertical planes transverse to the pleat faces. Then, the stack is placed in an oven to melt the glue and bond the pairs of opposing faces together. If desired, irons could be provided to press the pleats after a selected number of passes. Although I prefer to create bond lines using an adhesive, particularly a hot melt adhesive, it is also possible to create the bond lines using a heat welder. After each pair of opposed pleat faces is laid they are welded together. I have found that a heat welder will bond two overlying sheets without affecting a third sheet below the sheets which are bonded.

In Figures 1 and 2 I show the adhesive lines being applied to pleated fabric. If desired, one can apply the adhesive to the fabric first and then pleat the fabric.

Referring now to Figure 3, a splitter 20 is positioned above the stack so that blades 21 and 23 are positioned directly above adjacent glue lines 18a and 18b. Splitter 20 is then moved through the stack thereby cutting the stack along the glue lines. These cuts form two single cell honeycomb panels 24 and 26.

Preferably, the knife cuts between two planes of glue lines A and B so that after cutting the set of glue lines 18a in plane A are in one panel 24 and the set of glue lines 18b in plane B are in a second panel 26. Alternatively, the knife could cut through a plane of glue lines so that a portion of each glue line is in each panel. Each cell 30 has four primary side walls 31, 32, 33 and 34. Because of the method of manufacture a tab 28 has been

formed between adjacent pleat faces or cell sidewalls 32 and 33 and contrast opposite side walls 33 and 34 meet to form a standard pleat. Adjacent cells are connected together by glue lines 18c and 18d. I prefer to provide a standard pleat face of 1/2" with a 1/4" bridge formed by glue lines 18c and 18d. Preferably the tab has a width of 1/16" creating an overall width of 1 5/16". The region between glue lines 18 and 18b is preferably 1/8". Thus, the width of stack 10 would be 2 3/4" to make two panels of this preferred fabric size. Other standard sizes of pleat faces ranging from 1/4" to about 1" can easily be made with this process. Indeed, the pleats can be any desired size.

I prefer that cutter 20 have two outside knives 21 and 23 and one inside knife as shown in Figure 3. The use of two outside knives allows for a better cutting of the glue lines and for a greater tolerance for error of a glue plane placement and thickness. The center knife cuts the accordion pleat remnant in half so that the resulting smaller strips can easily be drawn off by vacuum.

Figure 4 shows a double cell honeycomb stack 30 being split. The cells are formed by sets of glue lines 18a and 18b in planes A and B. The double cells are split by knives 21 and 23 along a perpendicular plane through the glue lines. This method forms two panels of pleated material 32 and 34 each having a joint tab 28 on one face between each pair of adjacent pleat

faces 36 and 38. The joint tabs 28 extending between each pair of pleats preferably should measure at least 1/16" in length.

Figure 5 is a diagram of a five-cell honeycomb stack 40 being split. The five-cell honeycomb stack is split along a cutting plane parallel to the planes A and B containing glue lines 18a and 18b. This method forms two panels 42 and 44 of double cell honeycomb material having tabs 28 on one face. The splitter shown in Figure 5, generally designated as 20, is comprised of a center blade 22 which pierces the stack 40 and two blades 21 and 23 that cut the interior edge of each alternating adhesive bond lines 18a and 18b.

Although I have shown the tabs being formed from a single glue line, tab 28 may be formed by either means of a single or a double bond or line of adhesive. The joint tabs in the separated panels in the figures are the same size. However, this is not necessary. Also, I have shown the glue lines extending to the ends of the tabs. But, this is not necessary.

A major advantage of the present method over the prior art is the gluing machine can make two, tabbed, pleated layers; two, tabbed, single-cells; or two tabbed, double-cell layers by changing the pump pressure and the orifice configuration on the glue heads. Such a change can be made in less than hour. Since the splitter is much faster and simpler than the gluing process, it is a less expensive machine and can handle the output of 3 or 4 gluing machines.

The stack of the present invention can be formed on several types of prior art pleating machines modified to have glue heads and to fold the fabric into the stack after gluing, or by simply modifying the glue heads on machines which have them to place more glue lines at different intervals. Such modified machines should be able to put out nearly twice the effective output than they did prior to modification.

Although I have shown certain present preferred embodiments of my method and the pleated and honeycomb structures made therefrom, it should be distinctly understood that my invention is not limited thereto, but may be variously embodied within the scope of the following claims.

I claim:

1. A method for producing a pleated and tabbed fabric comprising the steps of

pleating a sheet of material to form a stack of pleated material having pairs of opposed pleat faces;

applying at least one bond line between each pair of opposed pleat faces so that the applied bond lines are in one of two bond line planes which are normal to the pleat faces;

stacking the opposed pleat faces on top of one another to bond the pleat faces together thereby forming a stack of cellular material having at least two sets of bond lines each set aligned in a bond plane transverse to the pleat lines; and

cutting the stack along a cutting plane through the stack, the cutting plane being parallel to the bond planes, so that one of one plane of bond lines and a portion of one plane of bond lines is on either side of the cutting plane to form two panels of pleated and tabbed fabric.

2. The method of claim 1 wherein the panels have a joint tab extending between each pair of pleats which tab is at least 1/16" in length.

3. The method of claim 2 wherein all joint tabs are identical in size.

4. The method of claim 1 wherein the pleated panels are of a material suitable for use as a window covering.

5. The method of claim 1 also comprising the step of applying a third plane of bond lines between selected opposed pleat faces so that after cutting the stack a panel of cellular material is formed.

6. The method of claim 5 wherein the panel of cellular material contains cells which are not symmetrical.

7. The method of claim 5 also comprising the step of applying a fourth plane of bond lines between selected opposed pleat faces so that after cutting the stack two panels of cellular material are formed.

8. The method of claim 1 wherein the bond lines are formed by one of an adhesive, a hot melt adhesive and an ultrasonic bond.

9. A pleated and tabbed material made by the steps of:
pleating a sheet of material to form a stack of pleated material having pairs of opposed pleat faces;

applying at least one bond line between each pair of opposed pleat faces so that the applied bond lines are in one of two bond planes which are normal to the pleat faces;

stacking the opposed pleat faces on top of one another to bond the pleat faces together thereby forming a stack of cellular material having at least two sets of bond lines each set aligned in a bond plane transverse to the pleat lines; and

cutting the stack along a cutting plane through the stack, the cutting plane being parallel to the bond planes, so that one of one plane of bond lines and a portion of one plane of bond lines is on either side of the cutting plane to form two panels of pleated and tabbed fabric.

10. A honeycomb material of the type comprising a series of cells, a portion of at least some cells facing a front of the honeycomb material and having an exposed pleat and a portion of at least some cells facing a rear of the honeycomb material and having an exposed tab made by the steps of

pleating a sheet of material to form a stack of pleated material having pairs of opposed pleat faces;

applying at least one bond line between each pair of opposed pleat faces so that the applied bond lines are in one of at least three bond planes which are normal to the pleat faces;

stacking the opposed pleat faces on top of one another to bond the pleat faces together thereby forming a stack of cellular material having at least two sets of bond lines each set aligned in a bond plane transverse to the pleat lines; and

cutting the stack along a cutting plane through the stack, the cutting plane being parallel to the bond planes so

that one of one plane of bond lines and a portion of one plane of bond lines is on either side of the cutting plane to form at least one panel of cellular tabbed material.

ABSTRACT OF THE DISCLOSURE

A tabbed honeycomb structure or pleated panel is made from a stack of collapsed multi-cellular material. The stack is split at bond lines thereby forming the panels of pleated or honeycomb material having a joint tab on one face.

09/03/94 10:40:00

Figure 1

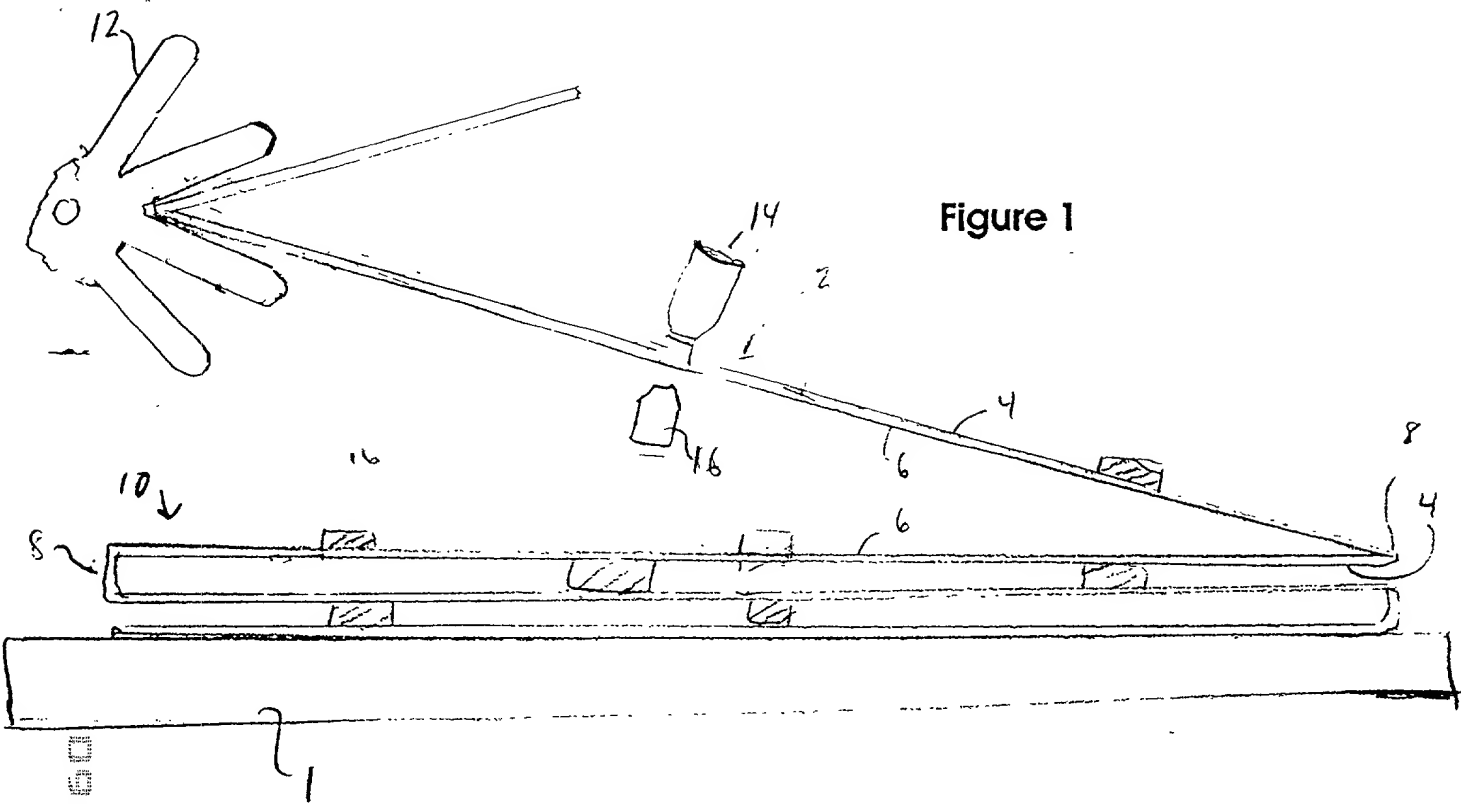


Figure 2

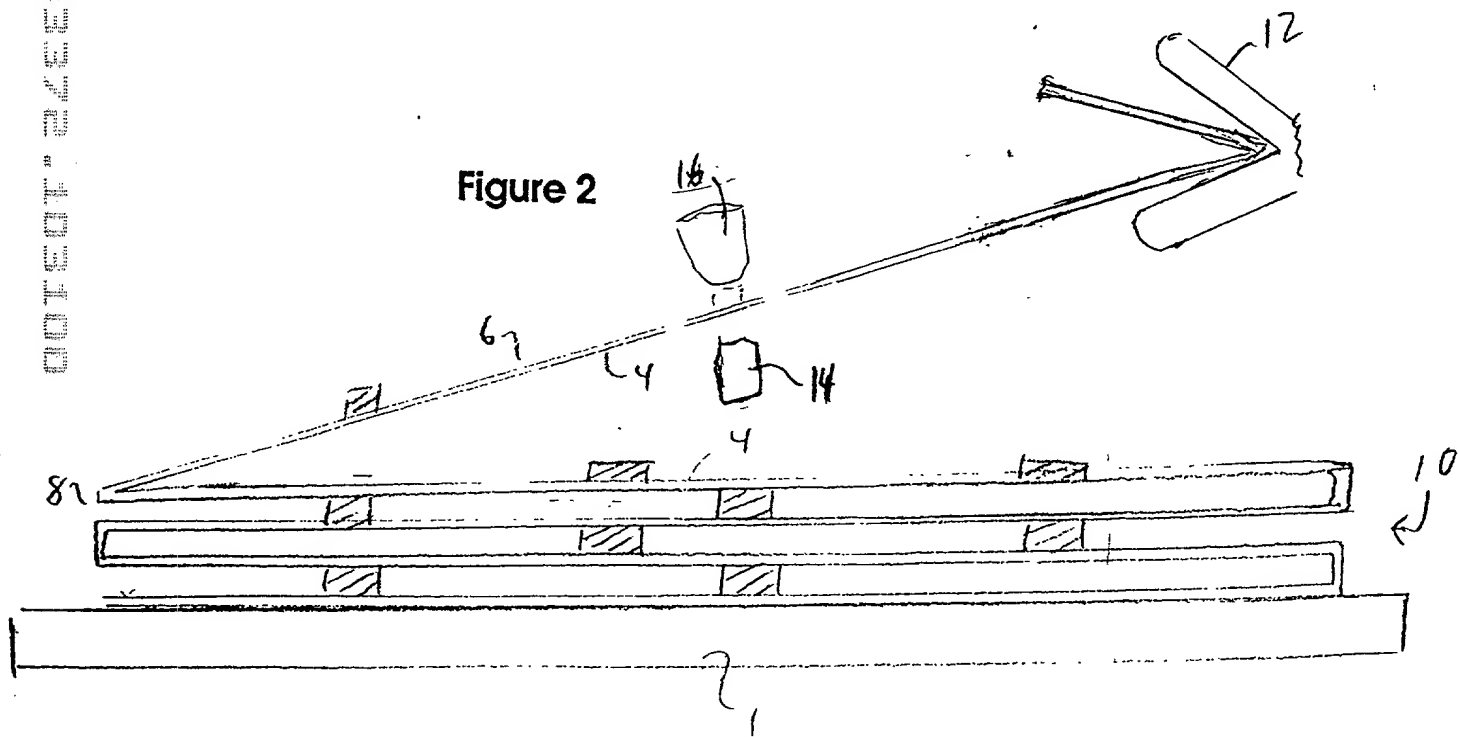


Figure 3

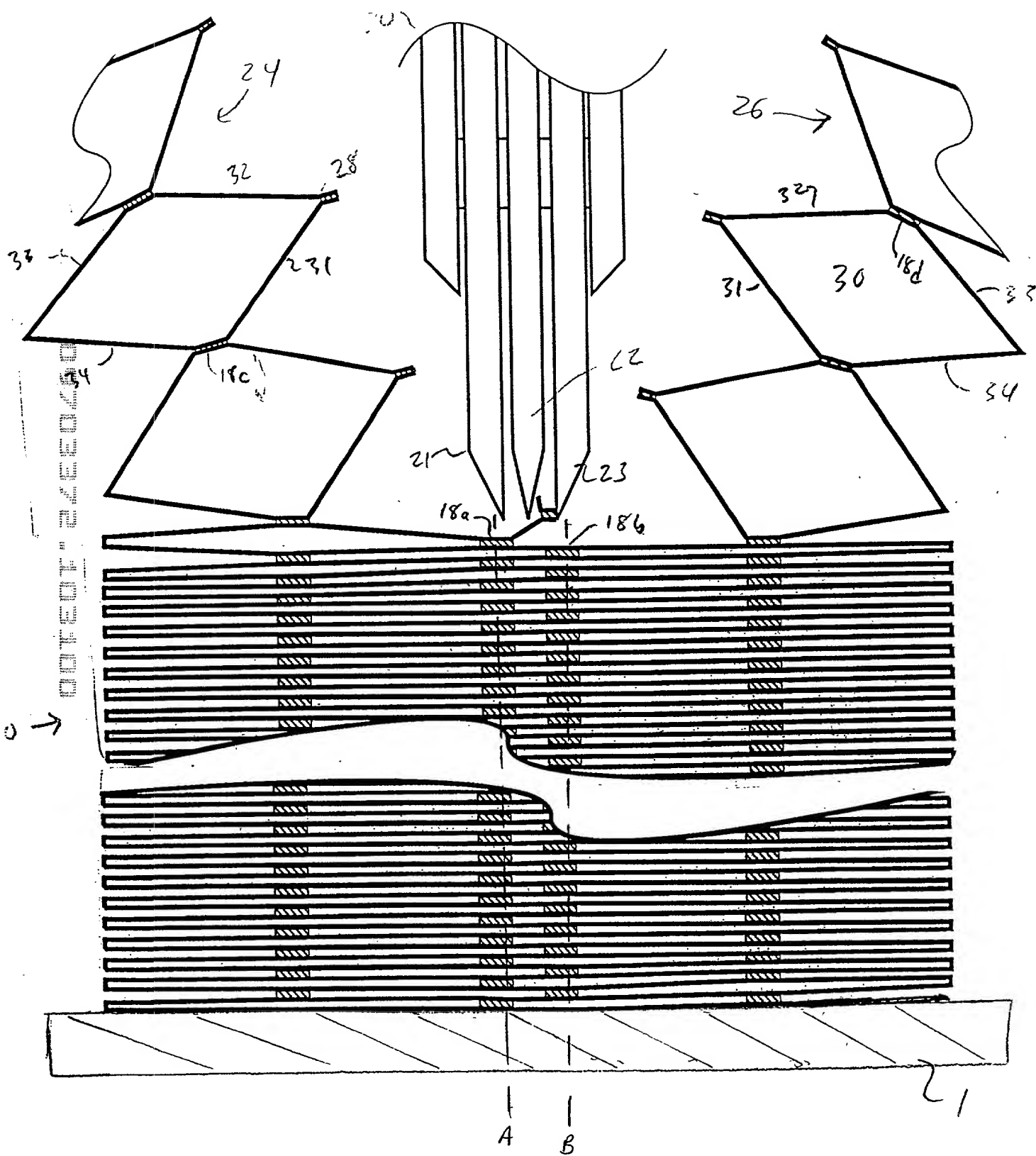
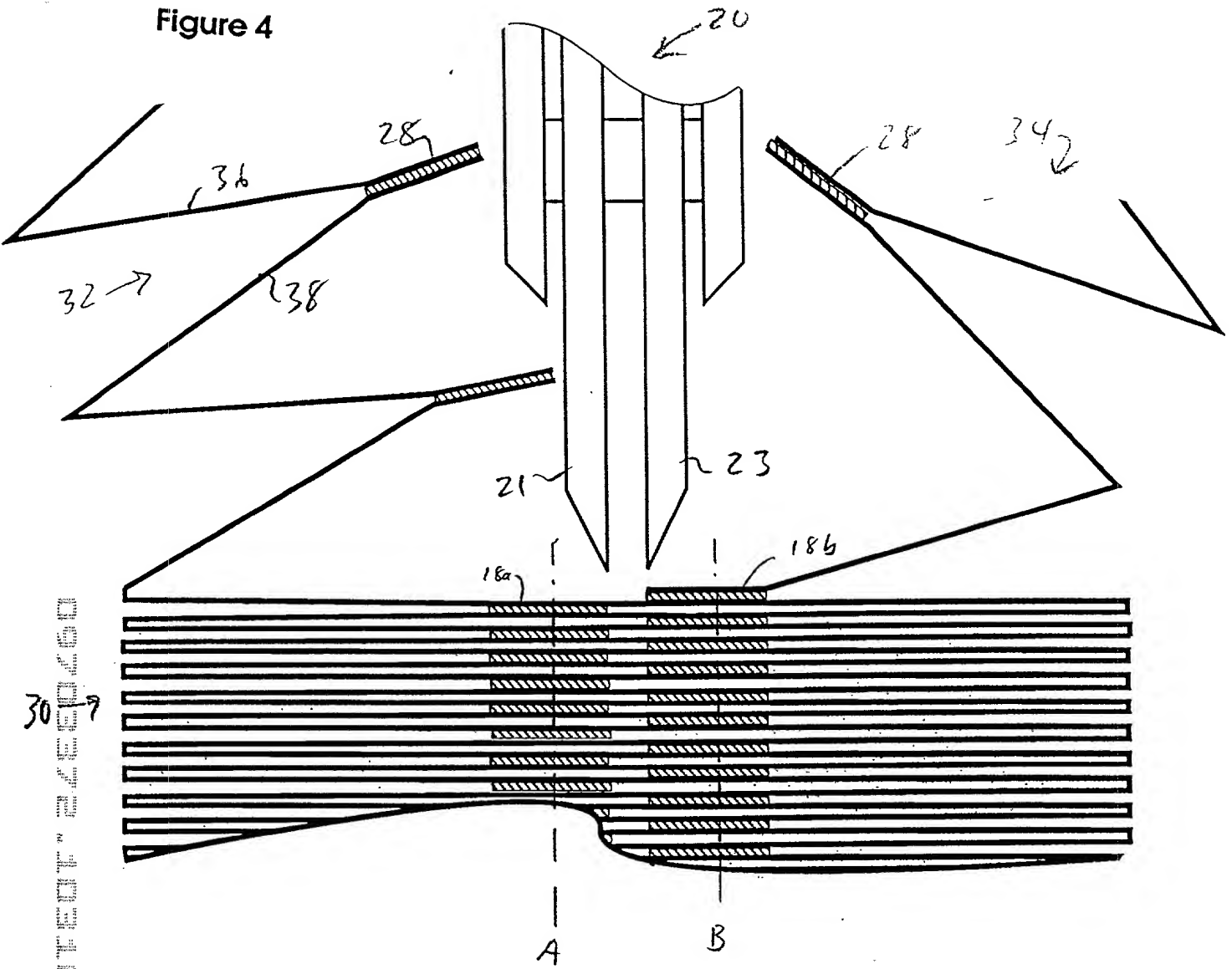


Figure 4



DECLARATION FOR PATENT APPLICATION

Docket No. 910122

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled PLEATED AND CELLULAR MATERIALS AND, the specification of which (check one):
METHOD FOR THE MANUFACTURE THEREOF USING A SPLITTER

X is attached hereto
_____ was filed on _____ as Application Serial No. _____
_____ and was amended on _____, if applicable

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
			Yes	No
_____	_____	_____		
(Number)	(Country)	(Date/Month/Year Filed)		

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States applications listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

_____	_____	_____
(Application Serial No.)	(Filing Date)	(Status: patented, pending, abandoned)

I hereby appoint the following attorney(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith: Lynn J. Alstadt, Reg. No. 29,362; George P. Baier, Reg. No. 26,717; Paul A. Beck, Reg. No. 22,289; Michael L. Dever, Reg. No. 32,216; Robert J. Pugh, Reg. No. 36,895; and George Raynovich, Jr., Reg. No. 19,829

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon

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